HQ Update Regarding Aura

Ken Jucks

Aura Program Scientist

NASA HQ

Who's who @ HQ **today**?

- Ken Jucks, Program Manager UARP and Program Scientist for Aura, OCO-2, OCO-3, CLARREO (and CLARREO-Pathfinder), ASCENDS, ACT-America
- Hal Maring, Program Manager RSP, Program Scientist for EV Suborbital-2, ACE, MAIA
- Barry Lefer, Program Manager TCP (for last year), Program Scientist for GEO-CAPE and TEMPO
- Rich Eckman, Program Manager ACMAP, Program Scientist for SAGE-III on ISS, co-chair on CEOS ACC.
- David Considine, Program Manager MAP, Program Scientist for CERES, CloudSat, CALIPSO
- Cheryl Yuhas, Aura Program Executive (and PE for all operating missions)
- John Haynes, Program Manager for Air Quality and Health Applied Science Program.
- Bob Swap from UVA is concluding his IPA at HQ, working mostly with Hal.

What's next for Aura & Atm. Composition?

- The next Senior Review is AGAIN on the horizon.
  - Most likely will be the same instructions as last round.
- Aura Science Team and ACMAP proposals were due a few weeks ago. HQ is working the logistics for the review, with DESIRE for for decisions by end of year.
- OCO-2 is approaching designed 2 years in orbit. Satellite/instrument are working well.
- TEMPO is now in Phase C. Selection of commercial telecommunication satellite is pending.
- MAIA was selected in the last round of Earth Venture Instrument (#3). Will provide unique aerosol information and relate to AQ and health.
- SAGE-III is due to launch to ISS in November.

What's NASA's near term plan?

- NASA's budget in Earth Science, as proposed for FY17, is expected to be similar to FY16 (but we expect Congress to pass a Continuing Resolution for FY17).
- Venture Class is moving forward.
  - The EVM-2 (small space mission) selection announcement should happen soon.
  - EVI-4 (Instruments of opportunity) AO was recently released. Proposals due in ~2 months.
  - EV Suborbital-4 solicitation will come out in ~2 years.
- Other missions related to last Decadal Survey to launch in the near future include: NI-SAR (partnership with India, JUST entered Phase C); SWOT (partnership with CNES, in Phase C); GEDI (EVI-2 selection to ISS in 2019); ECOSTRESS (EVI-2 selection to ISS in 2018); CLARREO-Pathfinder (entering Phase A, reflected solar instrument only to ISS).
- OCO-3 to ISS in 2018 (now in Phase C).
- Instruments supplied to JPSS satellites by NASA include CERES follow-on and OMPS-Limb
- The real unknown right now is the set of recommendations from the next Decadal Survey and how that will define the future missions.

Survey Status

- NRC Approval, May 6, 2015
- Chairs and steering committee have been named, though one co-chair stepped down recently
- 1st round of white papers for science topics were submitted, which helped define committees.
- 2nd round of white papers were in May (>150 received).
- NASA HQ are not to be part of this process.
- NRC Boards covering atmospheric sciences, polar research, ocean science, hydrology, and the solid Earth will be collaborating partners with the Space Studies Board.
  - Includes membership, execution, staffing, etc.
- Final report due ~ 2 years from survey start (Mid 2017).
- Info @ http://sites.nationalacademies.org/DEPS/ESAS2017/index.htm

Decadal Survey Steering Committee

Waleed Abdalati, *Chair*, University of Colorado, Boulder
Steven Battel (NAE), Battel Engineering
Stacey Boland, Jet Propulsion Laboratory
Robert Braun (NAE), Georgia Institute of Technology
Shuyi Chen, University of Miami
William Dietrich (NAS), University of California, Berkeley
Scott Doney, Woods Hole Oceanographic Institution
Christopher Field (NAS), Carnegie Institution for Science
Helen Fricker, Scripps Institution of Oceanography
William Gail, Global Weather Corporation
Sarah Gille, Scripps Institution of Oceanography
Dennis Hartmann (NAS), University of Washington
Daniel Jacob, Harvard University
Anthony Janetos, Boston University
Everette Joseph, University at Albany, SUNY
Molly Macauley, Resources for the Future
Joyce Penner, University of Michigan
Soroosh Sorooshian (NAE), University of California, Irvine
Graeme Stephens (NAE), California Institute of Technology
Byron Tapley (NAE), University of Texas at Austin
W. Stanley Wilson, NOAA/NESDIS (retired)

Decadal Survey Committees

5 committees set up

- Climate Variability and Change: Seasonal to Centennial
- Earth Surface and Interior: Dynamics and Hazards
- Global Hydrological Cycles and Water Resources
- Marine and Terrestrial Ecosystems and Natural Resource Management
- Weather and Air Quality: Minutes to Subseasonal

There are supposed to be “cross-cutting themes” across these committees. What they are is TBD.

Committee Members

Climate Variability and Change: Seasonal to Centennial

- Dr. Carol Anne Clayson (Co-Chair), Woods Hole Oceanographic Institution
- Dr. Arlyn E. Andrews, NOAA Earth System Research Laboratory
- Dr. Lee-Lueng Fu, Jet Propulsion Laboratory
- Dr. Guido Grosse, Alfred-Wegener-Institute for Polar and Marine
- Dr. Randal D. Koster, NASA Goddard Space Flight Center
- Dr. Sonia Kreidenweis, Colorado State University
- Dr. Emilio F. Moran, Michigan State University
- Dr. Venkatachalam Ramaswamy, National Oceanic and Atmospheric Administration
- Dr. Cora E. Randall, University of Colorado
- Dr. Philip J. Rasch, Pacific Northwest National Laboratory
- Dr. Eric J. Rignot, University of California, Irvine
- Dr. Christopher Ruf, University of Michigan
- Dr. Ross J. Salawitch, University of Maryland
- Dr. Amy K. Snover, University of Washington
- Dr. Bruce A. Wielicki, NASA Langley Research Center
- Dr. Gary W. Yohe, Wesleyan University

Committee Members

Marine and Terrestrial Ecosystems and Natural Resource Management

- Dr. Compton J. Tucker - (Co-Chair), NASA Goddard Space Flight Center
- Dr. James A. Yoder - (Co-Chair), Woods Hole Oceanographic Institution
- Dr. Gregory P. Asner, Carnegie Institution for Science
- Dr. Francisco Chavez, Monterey Bay Aquarium Research Institute
- Dr. Scott Goetz, Woods Hole Research Center (soon N. Arizona)
- Dr. Patrick N. Halpin, Duke University
- Dr. Eric Hochberg, Bermuda Institute of Ocean Sciences
- Dr. Christian J. Johannsen, Purdue University
- Dr. Raphael M. Kudela, University of California, Santa Cruz
- Dr. Gregory W. McCarty, U.S. Department of Agriculture
- Dr. Linda O. Mearns, National Center for Atmospheric Research
- Dr. Mary Jane Perry, University of Maine
- Dr. David A. Siegel, University of California, Santa Barbara
- Dr. David L. Skole, Michigan State University
- Dr. Susan L. Ustin, University of California, Davis
- Dr. Cara Wilson, National Oceanic and Atmospheric Administration

Committee Members

Weather and Air Quality: Minutes to Subseasonal

- Dr. Steven A. Ackerman - (Co-Chair), University of Wisconsin-Madison
- Mr. Richard E. Carbone - (Co-Chair), NCAR
- Dr. Philip E. Ardanuy, INNOVIM, LLC
- Dr. Nancy L. Baker, Naval Research Laboratory
- Dr. Elizabeth A. Barnes, Colorado State University
- Dr. Stanley G. Benjamin, National Oceanic and Atmospheric Administration
- Dr. Mark A. Bourassa, Florida State University
- Dr. Bryan N. Duncan, NASA Goddard Space Flight Center
- Dr. Charles E. Kolb, Aerodyne Research, Inc.
- Dr. Ying-Hwa Kuo, University Corporation for Atmospheric Research
- Dr. W. Paul Menzel, University of Wisconsin-Madison
- Ms. Maria A. Pirone, Harris Corporation
- Dr. Armistead G. Russell, Georgia Institute of Technology
- Ms. Julie A. Thomas, Scripps Institution of Oceanography UCSD
- Dr. Duane Waliser, California Institute of Technology
- Dr. Xubin Zeng, University of Arizona

Recent and new airborne campaigns, 3 from EVS-2.

- Many will provide data sets of interest to the Aura community
- KORUS-AQ
- ATom
- ACT-America
- POSIDON
- ORACLES

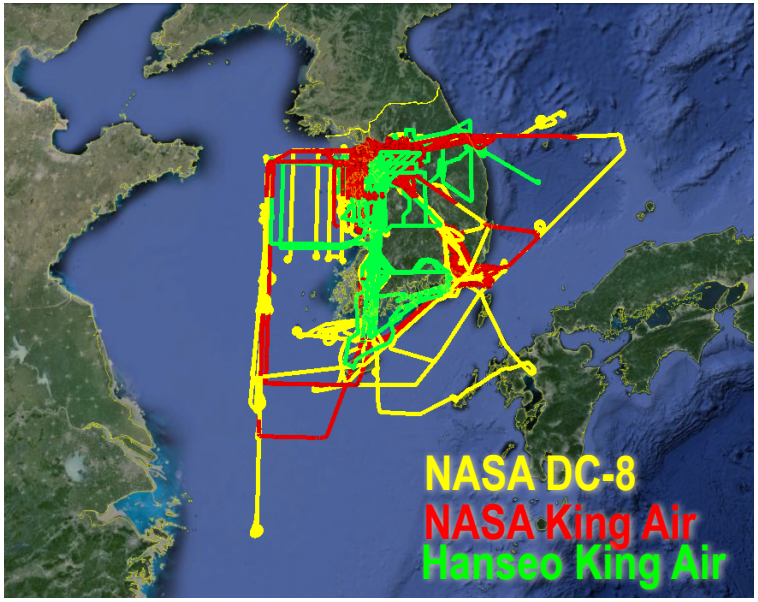
KORUS-AQ Campaign Summary

NASA-NIER Collaborative Campaign 29 April – 10 Jun 2016

NASA DC-8
20 science flights (154 hrs)

NASA King Air
30 science flights (130 hrs)

Hanseo Univ. King Air
32 science flights (100+ hrs)



3 aircraft, 8 major ground sites, ground-based lidars for aerosols and ozone, two ozonesonde sites, 22 AERONET, and 9 Pandora instruments:

- Characterized numerous high ozone and PM events during periods of light winds and high pressure. Ozone routinely over 100 ppbv.
- DC-8 and Hanseo profiled the lower atmosphere over Seoul more than 50 times under a range of conditions and times of day.
- Sampled Chinese urban outflow and desert dust at various altitudes over the Yellow Sea.
- Observed transported pollution in pre/post-frontal conditions, directly profiling pollution embedded in frontal clouds on three events.
- UC-12 raster mapped NO_2 and HCHO for the Seoul Metropolitan Area (10 times) and Busan (2 times)
- All three aircraft directly characterized large point source emissions from west coast power plants and petrochemical facilities.

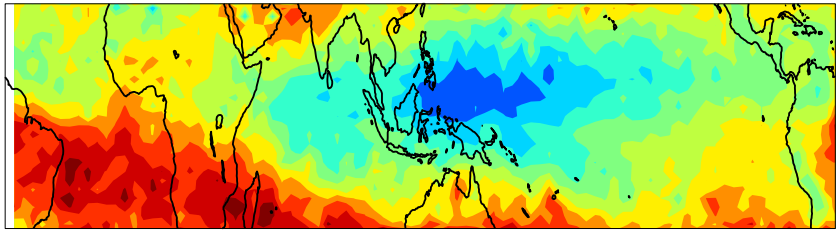
Next Steps:

- Preliminary Data: 15 January 2017
- Science Team Meeting: Spring 2017
- Final Data: 15 June 2017
- Rapid Science Synthesis Report for decisionmakers

Pacific Oxidants, Sulfur, Ice, Dehydration, and cONvection experiment (POSIDON)

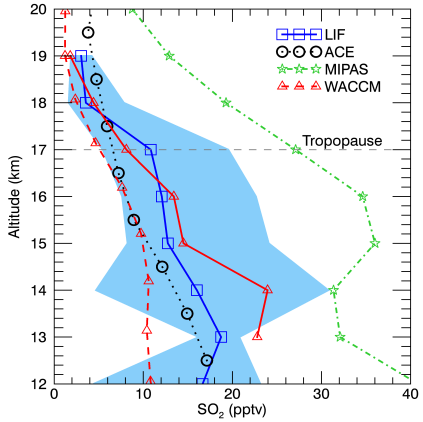
– A WB-57F mission in Guam in October 2016

Science background: Deep convection, cold tropopause, and low ozone make tropical western Pacific important for chemical transport to the stratosphere.



October TES O_3 map, blue=low, red=high

Extensive anvil cirrus by deep convection is important for climate.



SO_2 uncertainty is high

Goals:

1) Investigate low O_3 values and evaluate the hypothesis of a corresponding OH minimum in the TTL
2) Investigate the transport and chemistry of sulfur species
3) Assess the validity of global chemistry transport model projections of sulfur emissions on stratospheric sulfate aerosol
4) Obtain measurements of the microphysical properties and water content of anvil cirrus

Timing:

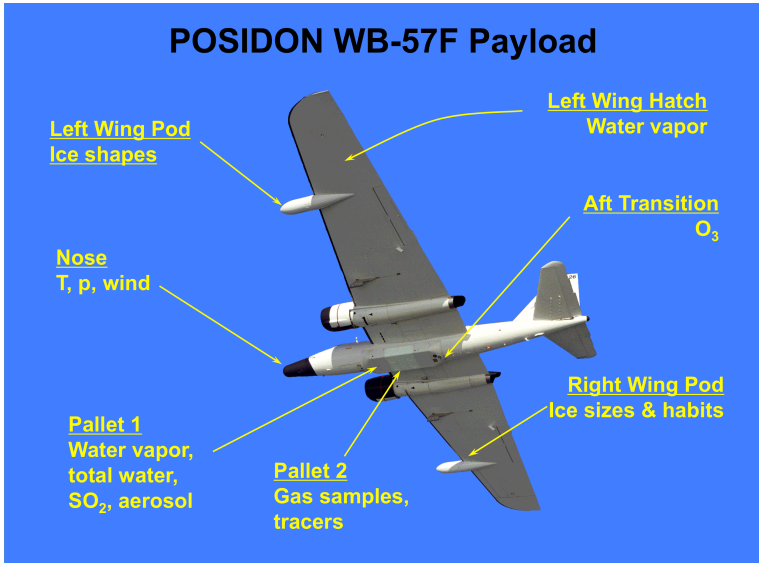
1) Ideal for the O_3/OH study
2) ATTREX follow-on: Covers a different season
3) Coordination with an Air Force mission for cost saving

Funds:

UARP, R&A augmentation funds, NOAA CS salaries

Logistics:

Organized quickly with cooperation from JSC, ESPO, and funded science teams

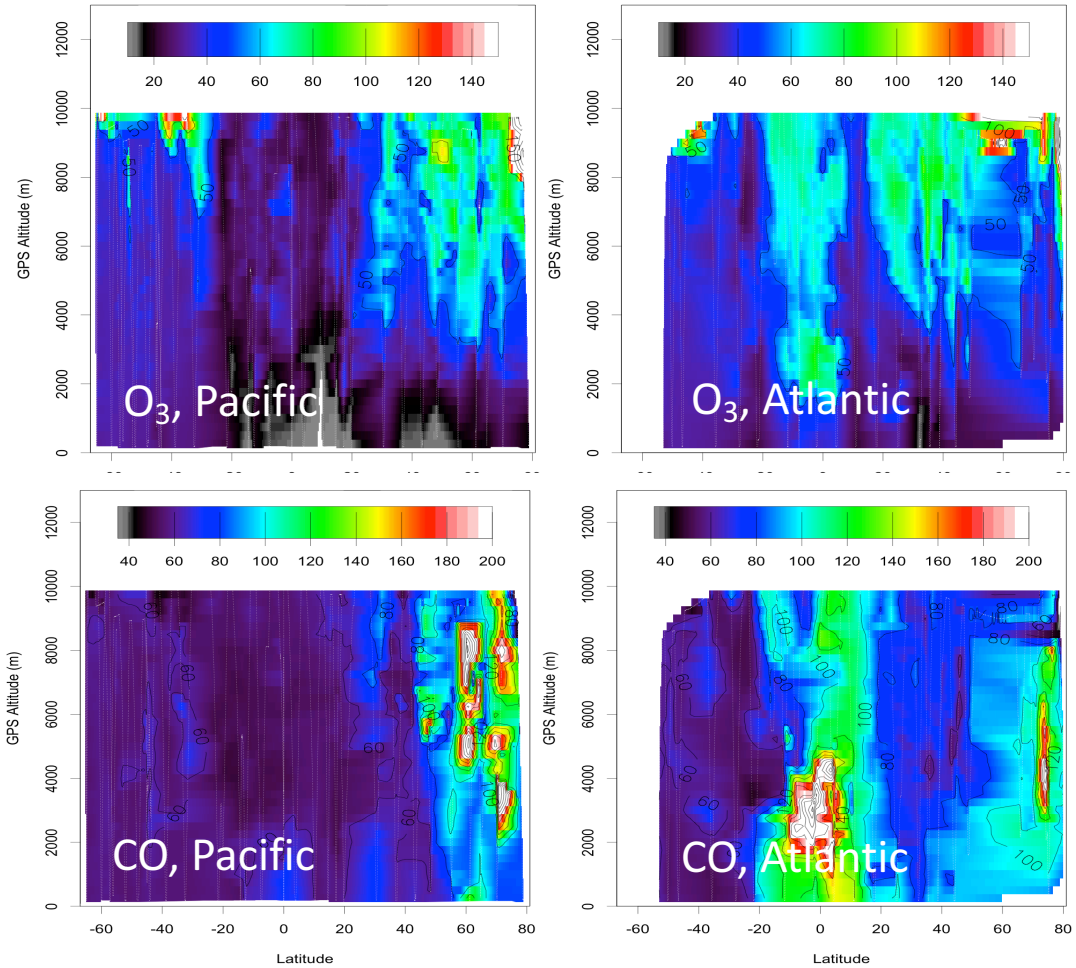


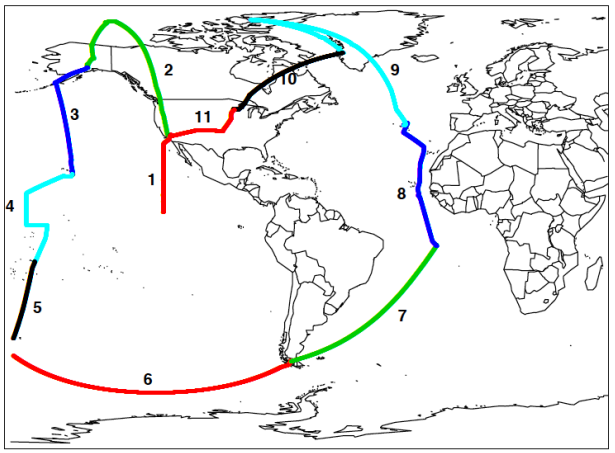
Atmospheric Tomography Mission

EVS-2 Investigation, obtaining atmospheric cross sections in the Pacific and Atlantic for numerous key trace gases and aerosols.

PI: Steve Wofsy, Harvard. Teams from: GSFC, LaRC, ARC, AFRC (NASA DC-8), NOAA, CU, UC-I, NCAR, PSU, UC-SD, CIT, UNH.

Sample crosscuts from 80N -65S latitude, 0-10 km





Flights for the first ATom deployment (July/August 2016). Data to left show obvious biomass burning signature in Atlantic relative to Pacific.

Future deployments will be in other seasons with similar flight profiles.

These data will be used extensively with satellite data from Aura, OCO-2, Sentinel-5 Precursor, Terra, Aqua.

Atmospheric Carbon and Transport – America

an Earth Venture Suborbital mission

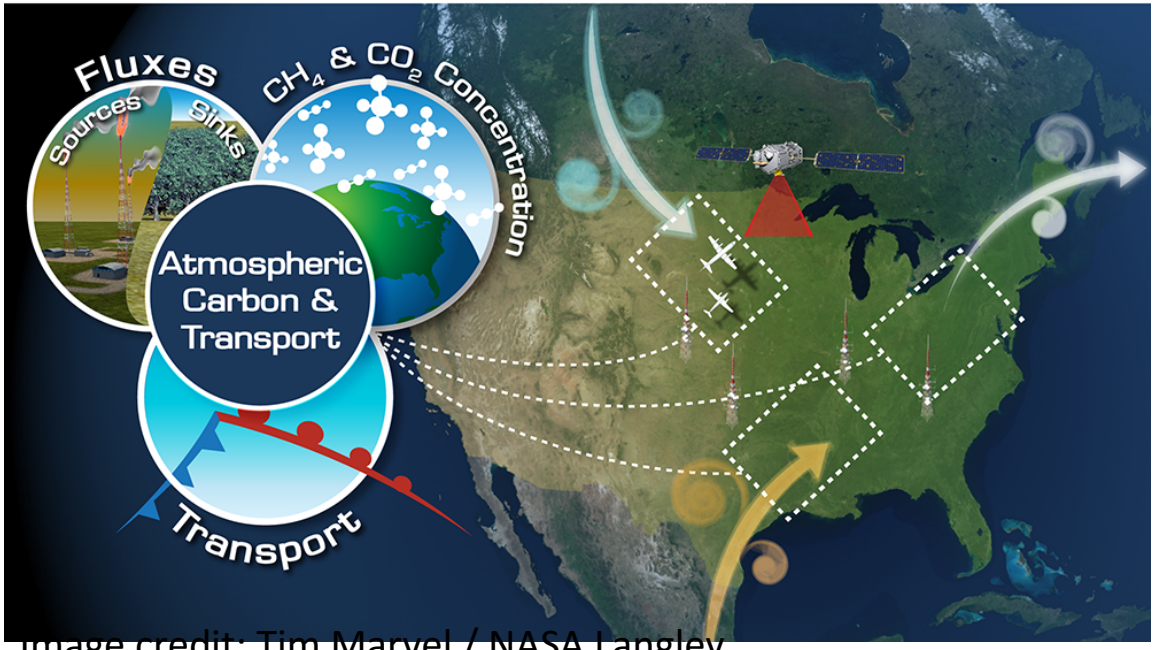


Image credit: Tim Marvel / NASA Langley

Five, 6-week long aircraft campaigns targeting the transport of CO_2 and CH_4 by synoptic weather systems across four seasons and three regions of the continental U.S. 2016-2019.

In situ CO_2 and CH_4 and associated trace gas measurements. Column CO_2 measured with airborne lidar. Wallops C-130 and Langley B200 aircraft. Investigators from 10 institutions.

Model-data synthesis using a multi-model ensemble for flux and transport model pruning.

Overarching goal of greatly reducing uncertainty in regional atmospheric inverse estimates of CO_2 and CH_4 fluxes.

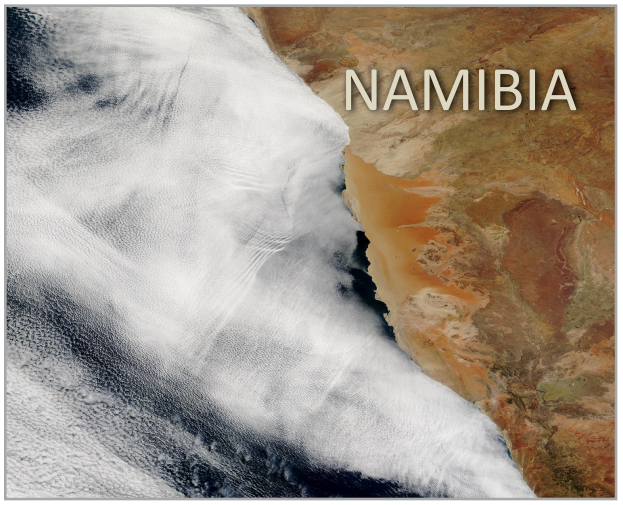
Three mission goals:

1. Reduce atmospheric transport uncertainty.
2. Improve regional-scale prior CO_2 and CH_4 flux estimates.
3. Evaluate the sensitivity of Orbiting Carbon Observatory-2 column CO_2 measurements to regional variability in tropospheric CO_2.

First field campaign complete: July-August 2016.
10 frontal passages, 10 fair weather flights, 2 Gulf inflow flights, 3 OCO-2 under flights.

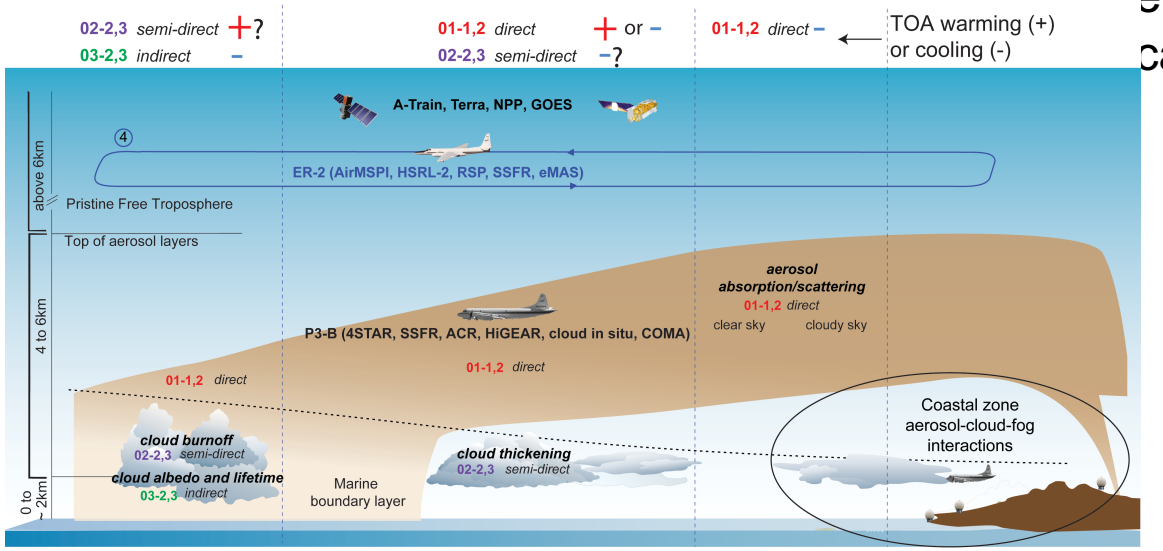
NASA Earth Venture Suborbital ORACLES

(ObseRvations of Aerosols above Clouds and the intEractionS)



ORACLES Science Objectives

- Determine the impact of African BB aerosol on cloud properties and the radiation balance over the South Atlantic.
- Acquire a process-level understanding of aerosol-cloud-radiation interactions and resulting cloud can be applied in global models.



Three intensive observational periods:

late-August - late-September 2016
Offshore flights with NASA P-3 and ER-2 Research Aircraft

August 2017
Offshore flights with NASA P-3 Research Aircraft

October 2018
Offshore flights with NASA P-3 Research Aircraft